



CDR IN OPERATIONS

Northern Hemisphere Snow Cover Extent

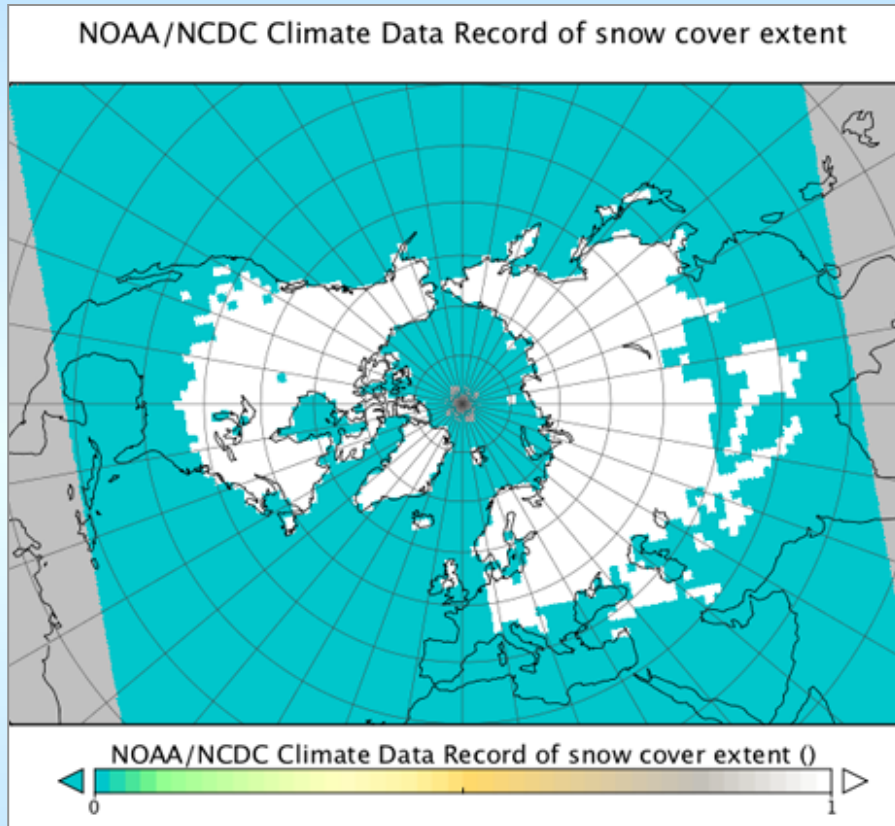
**David A. Robinson
Thomas W. Estilow
Rutgers, The State University of New Jersey**

david.robinson@rutgers.edu

Outline

- Short Project Description
- Production and QA Approach
- Issues
- Applications
- Key Findings
- Schedule

Snow Cover Extent CDR



Week ending February 27, 1978

- Binary values depicting snow cover extent (SCE): continental surfaces either snow covered or snow free
- 10/1966 to 5/1999 based on satellite-derived maps of NH SCE produced weekly by NOAA
- 6/1999 to present based on daily SCE output from the Interactive Multisensor Snow and Ice Mapping System (IMS)
- Digitized to an 88×88 half mesh National Meteorological Center (NMC) grid, overlaid on a polar stereographic projection
- Used in international assessments of climate variability and change, and in investigations on the role of snow cover in the climate system
- Mapping accuracy suitable for continental-scale and large regional climate studies

Product Delivery

CDR(s)	Period of Record	Temporal Resolution	Update Frequency	Update Lag	Spatial Resolution	Data file distinction criteria	Do you publicly serve the CDR at your institution?
Northern Hemisphere Snow Cover Extent	October 1966 to present	Weekly	Monthly	1 day	~190.5 km at 60N	Time period	Plain text legacy format, performance metrics are available

Validation & Quality Assurance

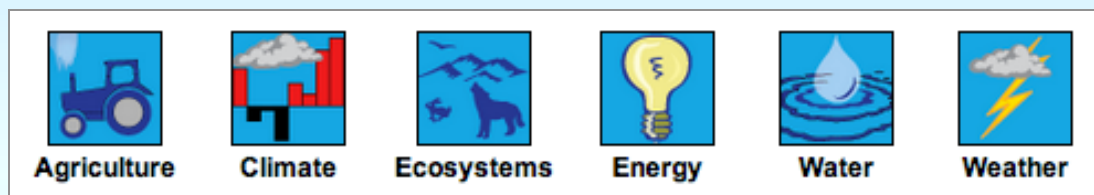
- Validation work recently conducted or planned with Brown, Derksen, Wang and others
 - Brown, R.D. & D.A. Robinson (2011) Northern Hemisphere spring snow cover variability and change over 1922-2010 including an assessment of uncertainty. *The Cryosphere*, 5, 219-229.
- Product quality assessed for each update month used to extend the long term record
 - File verification: Compare differences between latest netCDF file and update, generate MD5 checksum for manifest file
 - Snow extent verification: Visual inspection for continuity between IMS source maps and weekly SCE maps
 - Processing of derivatives: Generate maps, graphs and tables detailing SCE and compare against long term values

Concerns, Risks and Issues

- Minor grid errors discovered in cell coordinate and area files inherited from NOAA
 - Discrepancies in longitude adjacent to North Pole (3 cells)
 - NMC half mesh grid coordinates evaluated by Jim Biard at NCDC
 - No impact on presence or absence of snow in grid locations
 - Total calculated area of two grids agree within 0.74%
 - Issue documented in NH SCE C-ATBD
 - Grid corrections implemented in Version 00 Revision 01
- 3-year technical risks or issues
 - Forward processing dependent on continued IMS operation
 - Operating system, hardware, or Rutgers infrastructure failures
 - Full funding for research analyst
 - Continuation plans include system backups and documentation

Putting the SCE CDR to Work

- Snow cover and hydroclimate studies
- Snow-atmosphere studies
- Snow-sea ice studies
- Seasonal cycle analysis
- Forced model simulations
- Model intercomparison/validation
- Studying long-term climate changes
- Initializing weather prediction models
- Estimating snow melt runoff
- Analyzing surface albedo



- Key sector beneficiaries include

Associated Press
National Geographic
New York Times

Energy Companies
Finance & Economists
Private Forecasting

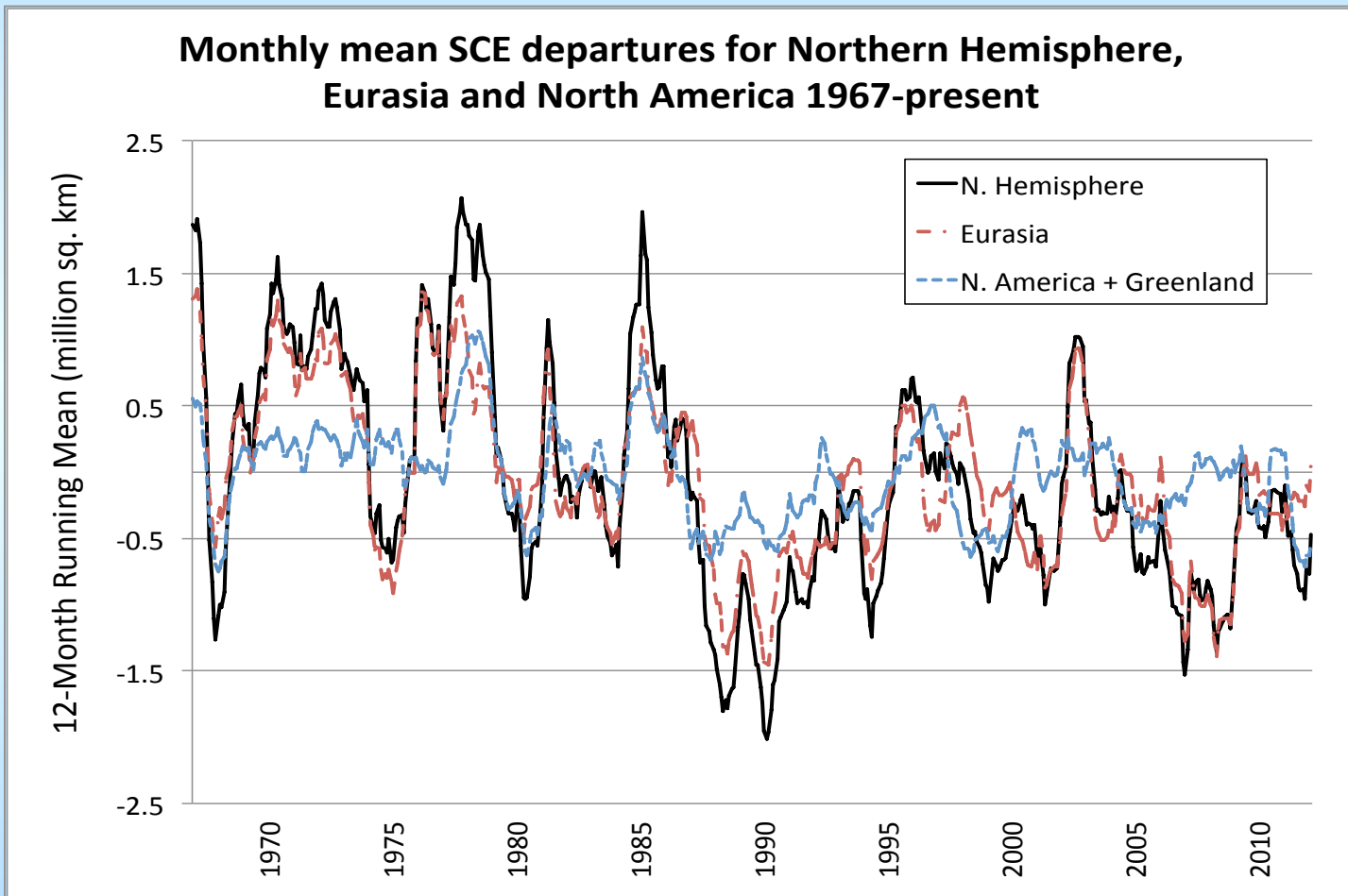
NASA, NCAR, NCEP
USDA, USDOE, USGS
State Climatologists

Research Groups
Educational Institutions
International

BAMS State of the Climate Report
IPCC Fifth Assessment Report
National Climate Assessment
NOAA Global Climate Dashboard

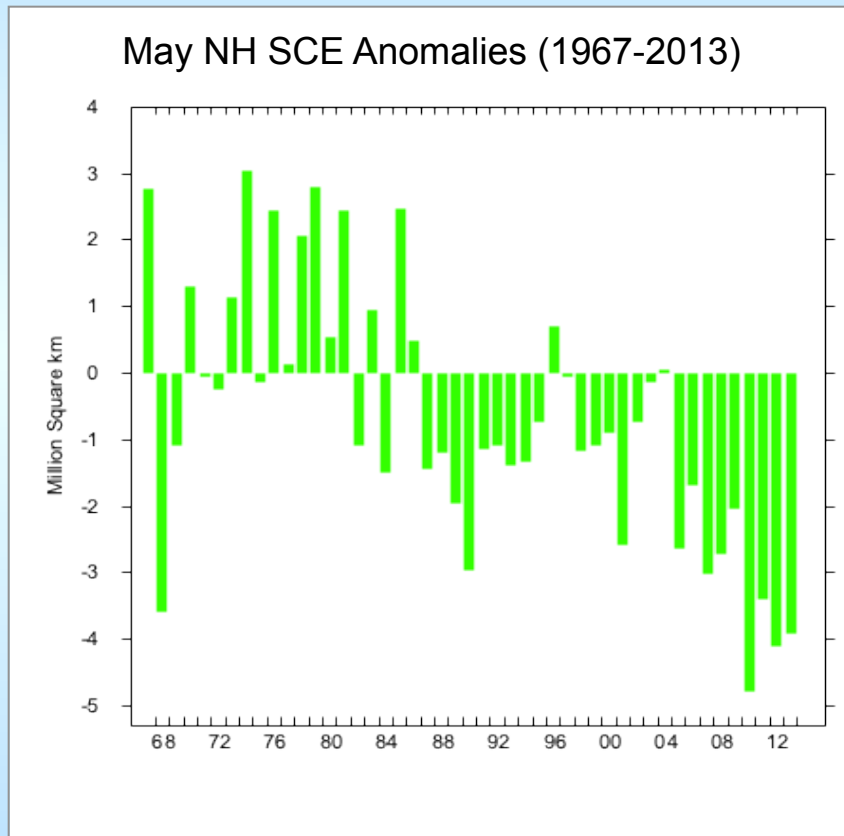
Key Findings

- **Step-wise decrease in snow cover extent: mid-1980s**

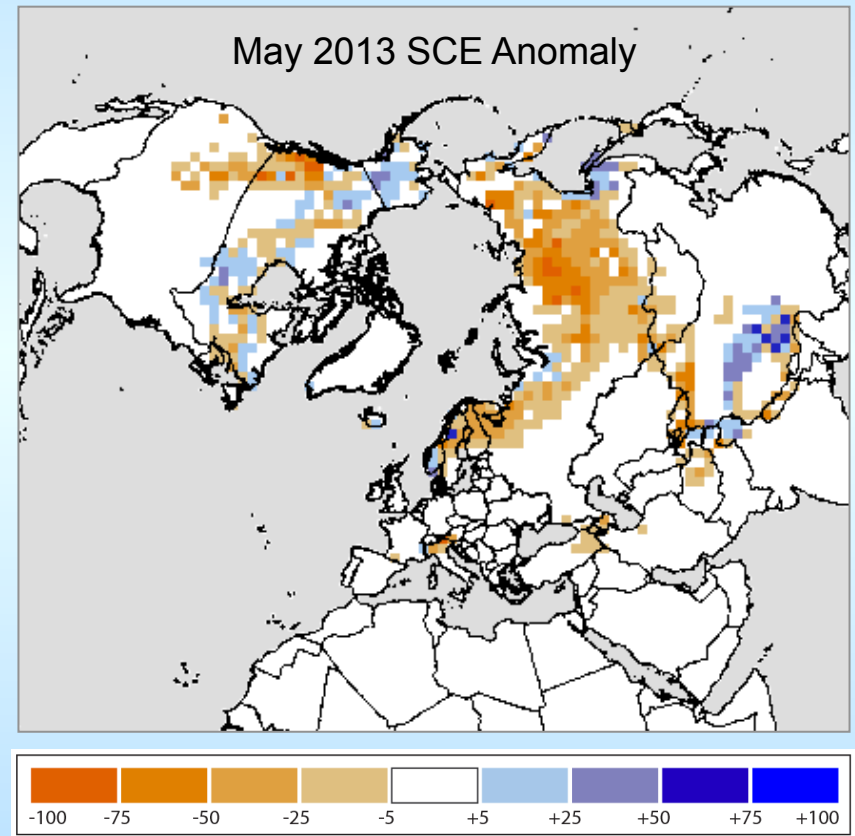


12 month running means. Difference from 1971-2000 mean

■ Spring decrease in snow cover extent



Difference from 1971-2000 mean



Looking Ahead

- CDR status
 - The delivered CDR is up-to-date, version 00 revision 01
 - Most recent Change Request completed
- 1-3 Year Planning Horizon
 - Consider collateral products (monthly snow netCDF)
 - Continue validation work
 - Expand and improve web presence and services
 - Consider other variables (depth, snow water equivalent)
 - Operational IMS record will span 15 years by 11/2013
 - Examine consistency for higher-resolution (spatial & temporal) CDR generation
- Requests/Recommendations for the CDR Program
 - Keep up the good work

Thanks

Snowcover.org



david.robinson@rutgers.edu